

infusion set. The fluid delivery system includes a controller, a pump assembly for extracting a quantity of infusible fluid from the reservoir and providing the quantity of infusible fluid to the external infusion set, the pump assembly comprising a pump plunger, the pump plunger having distance of travel, the distance of travel having a starting position and an ending position, at least one optical sensor assembly for sensing the starting position and ending position of the pump plunger distance of travel and sending sensor output to the controller, and a first valve assembly configured to selectively isolate the pump assembly from the reservoir, wherein the controller receives the sensor output and determines the total displacement of the pump plunger.

**[0018]** Some embodiments of this implementation may include one or more of the following features. Wherein the wearable infusion pump assembly includes wherein the controller correlates the displacement of the pump plunger to a volume of fluid delivered. Wherein the wearable infusion pump assembly includes wherein the controller, based on the volume of fluid delivered, commands an actuator to actuate the pump plunger to a target position. Wherein the wearable infusion pump assembly further includes a second valve assembly configured to selectively isolate the pump assembly from the external infusion set. Wherein the wearable infusion pump assembly further includes at least one optical sensor assembly for sensing the position of the second valve assembly. Wherein the wearable infusion pump assembly further includes a disposable housing assembly including the reservoir and a first portion of the fluid delivery system, and a reusable housing assembly including a second portion of the fluid delivery system. Wherein the wearable infusion pump assembly includes wherein a first portion of the pump assembly is positioned within the disposable housing assembly, and a second portion of the pump assembly is positioned within the reusable housing assembly. Wherein the wearable infusion pump assembly includes wherein a first portion of the first valve assembly is positioned within the disposable housing assembly, and a second portion of the first valve assembly is positioned within the reusable housing assembly. Wherein the wearable infusion pump assembly includes wherein a first portion of the second valve assembly is positioned within the disposable housing assembly, and a second portion of the second valve assembly is positioned within the reusable housing assembly. Wherein the wearable infusion pump assembly includes wherein the external infusion set is a detachable external infusion set configured to releasably engage the fluid delivery system.

**[0019]** In accordance with first implementation, a disposable housing assembly for an infusion pump assembly is disclosed. The disposable housing assembly includes a reservoir portion fluidly connected to a fluid path, the reservoir portion including a bubble trap wherein the bubble trap prevents air from moving from the reservoir portion to the fluid path. The bubble trap further includes an outlet portion and a non-outlet portion, the non-outlet portion including a tapered portion that tapers to a bottom portion, the tapered portion of the non-outlet portion ending at the outlet portion. The bubble trap also includes wherein the outlet portion including the bottom portion in communication with an upward ramped portion in fluid communication with a reservoir outlet, wherein the bottom portion configured

whereby fluid congregates in the bottom portion and the tapered portion configured whereby air bubbles congregate in the tapered portion.

**[0020]** Some embodiments of this implementation may include one or more of the following features. Wherein the disposable housing assembly further includes a membrane assembly, the membrane assembly connected to the reservoir wherein the membrane assembly forms a portion of the reservoir. Wherein the disposable housing assembly further includes a septum assembly, the septum assembly formed on the membrane assembly. Wherein the disposable housing assembly further includes a septum assembly, the septum assembly connected to the reservoir. Wherein the disposable housing assembly further includes a vent, wherein the vent further comprising a filter.

**[0021]** In accordance with one implementation, a fluid connector assembly is disclosed. The fluid connector assembly includes a body portion, a plug receiver portion located on the body portion, the plug receiver portion including a fluid path and configured to receive a plug on a reservoir, and a tubing, a first end of the tubing fluidly connected to the plug receiver portion fluid path.

**[0022]** Some embodiments of this implementation may include one or more of the following features. Wherein the body portion further includes an indent wherein the indent configured to interact with a reusable portion of an infusion pump. Wherein a second end of the tubing connected to a cannula assembly. Wherein the body portion further includes a tapered tubing opening, the first end of the tubing connecting to the tapered tubing opening. Wherein a first end of the body portion further comprising a locked icon. Wherein the underside of the body portion comprising a core. Wherein the core comprising an identification tag. Wherein the body portion comprising an identification tag. Wherein the identification tag is an RFID tag. Wherein the identification tag is a near-field communication readable RFID.

**[0023]** The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features and advantages will become apparent from the description, the drawings, and the claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0024]** FIG. 1 is a side view of an infusion pump assembly;

**[0025]** FIG. 2 is a perspective view of the infusion pump assembly of FIG. 1;

**[0026]** FIG. 3 is an exploded view of various components of the infusion pump assembly of FIG. 1;

**[0027]** FIG. 4 is a cross-sectional view of the disposable housing assembly of the infusion pump assembly of FIG. 1;

**[0028]** FIGS. 5A-5C are cross-sectional views of an embodiment of a septum access assembly;

**[0029]** FIGS. 6A-6B are cross-sectional views of another embodiment of a septum access assembly;

**[0030]** FIGS. 7A-7B are partial top views of another embodiment of a septum access assembly;

**[0031]** FIGS. 8A-8B are cross-sectional views of another embodiment of a septum access assembly;

**[0032]** FIG. 9 is a perspective view of the infusion pump assembly of FIG. 1 showing an external infusion set;

**[0033]** FIGS. 10A-10E depict a plurality of hook-and-loop fastener configurations;